Regional Operational Plan SF.2A.2015.05

Stock Assessment of Rainbow Trout at Lower Talarik Creek, 2015

by

Ian Fo

April 2015

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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STOCK ASSESSMENT OF RAINBOW TROUT AT LOWER TALARIK CREEK, 2015

by

Ian Fo

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April 2015

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SIGNATURE PAGE

Project Title:	Stock Assessment of Rainbow Trout at Lower Talarik Creek
Project leader (s):	Ian Fo
Division, Region and Area	Division of Sport Fish, Region II, Bristol Bay
Project Nomenclature:	
Period Covered	January 2015 through December 2015
Field Dates:	April 2015 through June 2015
Plan Type:	Category II

Approval

Title	Name	Signature	Date
Project leader	Ian Fo		4/9/2015
Biometrician	Matt Tyers		4/9/2015
Research Coordinator	Tim McKinley		4/13/15

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ABSTRACT

This project will assess the spring immigration and emigration of rainbow trout, an important sport fish in the Iliamna Lake drainage, using a weir at Lower Talarik Creek. This project will conclude, in 2015, the documentation of multiple years of rainbow trout abundance, length, maturity, growth, and spawning histories for 1 tributary of the Iliamna Lake drainage that is a popular sport fishing destination for rainbow trout. All rainbow trout captured at the weir for the duration of the project will be censused, tagged, and sampled for length and sexual maturity.

Key words: rainbow trout, *Oncorhynchus mykiss,* weir, Lower Talarik Creek, maturity, length, sex composition, growth, abundance, skip spawning.

PURPOSE

Rainbow trout (*Oncorhynchus mykiss*) are an important sport fish species in the Iliamna Lake drainage of southwest Alaska as indicated by a recent 5-year (2009–2013) average catch of 55,541 rainbow trout (Jennings et al. 2010, 2011 a-b, *In prep*; Romberg et al. *In prep*). In the last 40 years, the Alaska Department of Fish and Game (ADF&G) has conducted studies of Iliamna Lake drainage rainbow trout to document stock status and life history (Russell 1977; Brookover 1990; Minard et al. 1992; Schwanke and Evans 2005). Currently, management is directed by the Southwest Alaska Rainbow Trout Management Plan adopted by the Alaska Board of Fisheries in February 1990. The overriding philosophy of this plan is conservative wild stock management to maintain historical size compositions.

Lower Talarik Creek drains a 130 km^2 watershed and meanders approximately 13 km before flowing into the northwestern corner of Lake Iliamna (Figure 1). Lower Talarik Creek is known for its high quality rainbow trout sport fishery. The Lower Talarik Creek rainbow trout fishery is managed to maintain historic size composition and provide a diversity of angling opportunity through the special management designation of artificial fly only, catch and release. Additionally, fishing is closed from 10 April through 7 June to provide protection of rainbow trout during spawning. In 1999, the uplands, shore lands, and waters within the Lower Talarik Creek drainage were designated a Special Use Area by the Alaska Department of Natural Resources. With this designation, the special use area is managed 1) for fish and wildlife with emphasis on protecting the rainbow trout fishery and bear population, 2) to provide for traditional subsistence harvest activities, and 3) to accommodate public recreation.

The creek is relatively small and most angler effort occurs during the fall in the first 1.9 km upstream of its entrance into Lake Iliamna (Figure 2). Rainbow trout enter the creek from Lake Iliamna in the fall to feed on salmon spawn and carcasses and to stage for spawning the next spring. The sport fishery takes advantage of this migration and is most active from mid-August through early October. Creel surveys examined effort, angler demographics, and rainbow trout size composition of angler catch in the fishery in 1994 and 1996–2005 (J. Dye, Fishery Biologist III, Dillingham, unpublished data).

From 1972 through 1975, ADF&G conducted rainbow trout life history studies at Lower Talarik Creek with a weir that operated from late spring to October (Russell 1977). Spawning abundance, seasonal presence, size composition, and growth information were collected. Visual surveys of the creek estimated that approximately 950 rainbow trout annually spawned in the drainage (Russell 1977). From 2009 through 2014, a weir was deployed at Lower Talarik Creek in April or May after the creek was ice free and operated until early June. An average of 76 sexually mature rainbow trout were passed upstream through the weir and an average of 357 postspawn fish were passed downstream from 2009 through 2014. The lower numbers of fish

passed upstream than downstream was observed in the 1970s as well and is likely due to an inability to deploy the weir before fish begin migrating upstream. In addition, radiotagged fish were present in the headwater lakes of the drainage during winter 2009–2010. These overwintering fish would only be counted when migrating downstream.

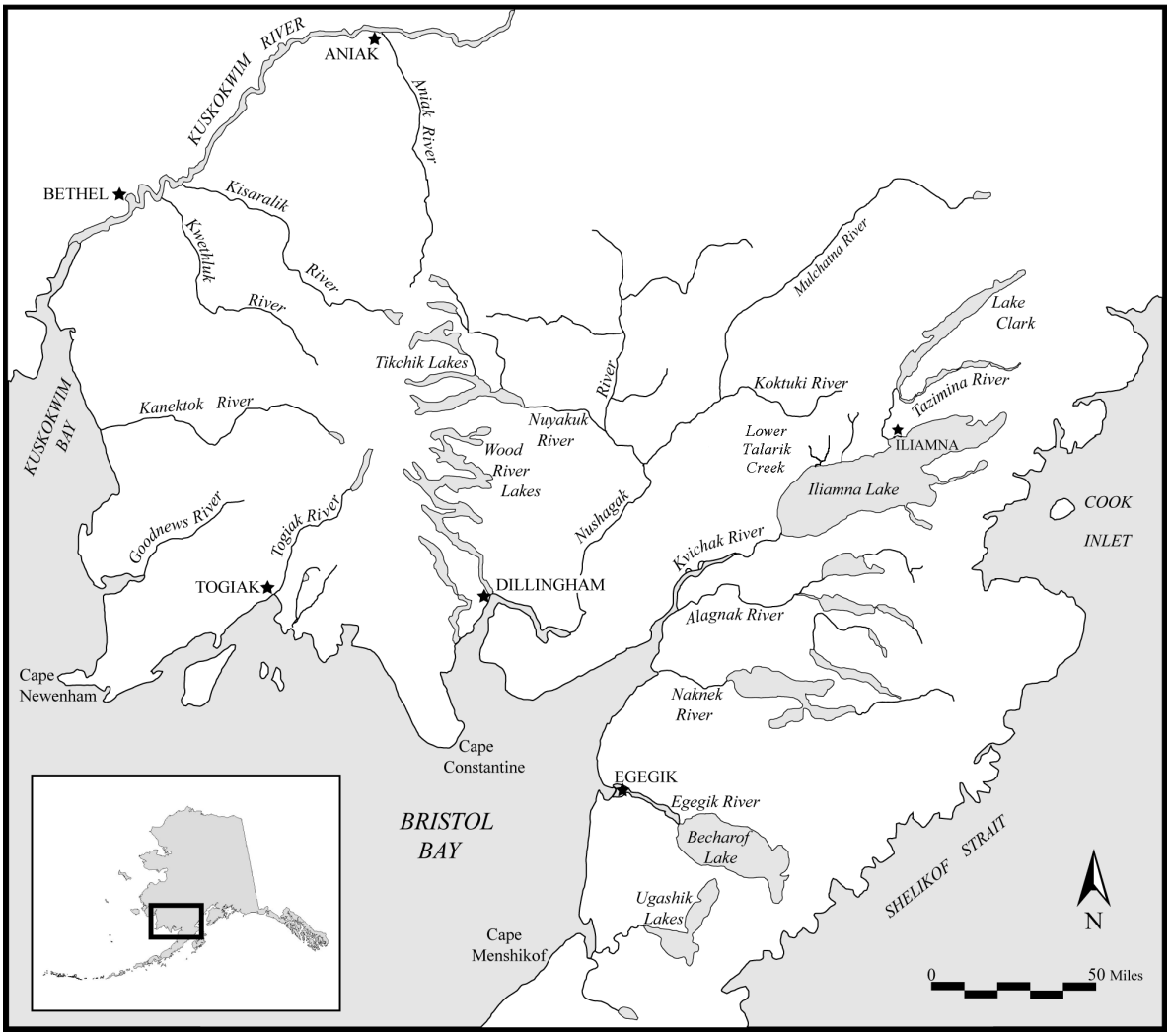

Figure 1.–Iliamna Lake drainage.

This project will provide data on rainbow trout spawning abundance and length composition that will be compared to data collected in the 1970s at Lower Talarik Creek, and will add to the data collected in 2009–2014. ADF&G has typically collected rainbow trout data from multiple populations for only 1 year at a time to estimate length composition for comparison to past collections. An analysis of historic rainbow trout length data collected in Bristol Bay resulted in the recommendation that data should be collected on specific components (i.e., spawning population) of a rainbow trout stock for a longer time period, rather than collect length information from multiple stocks for only 1 year at a time, to provide more effective monitoring and management decisions (Schwanke et al. 2011). In the past, this project has documented multiple years of rainbow trout abundance, length, maturity, growth, and spawning histories for

1 tributary of the Iliamna Lake drainage that is a popular sport fishing destination for rainbow trout. This portion of the project will conclude in 2015 after 7 years of data collection. Rainbow trout in Lower Talarik Creek have been found to reach sexual maturity at ages 4–6 and typically live until age 10 or 11 (Siedelman et al. 1973). Therefore, this project will document life history, including any cycles or patterns in abundance, length composition, or skip spawning of a cohort of rainbow trout throughout their sexually mature lifespan. It is not possible to monitor the entire drainage, so Lower Talarik Creek is serving as an indicator tributary for monitoring rainbow trout in the drainage. Data collected from 2009 to 2013 have been analyzed and discussed in a final report. Data collected from 2014 to 2015 will be analyzed and discussed in a separate report.

Figure 2.–Lower Talarik Creek drainage with weir site.

OBJECTIVES

PRIMARY OBJECTIVES

1) Census spawning rainbow trout immigrating and emigrating through the Lower Talarik Creek weir from 15 April through 8 June 2015.
2) Estimate length composition by length class of rainbow trout greater than or equal to 300 mm fork length (FL) in Lower Talarik Creek during April, May, and June 2015 such that the estimated proportions are within 5 percentage points of the actual values 95% of the time.
3) Estimate the proportion of sexually mature rainbow trout that pass the Lower Talarik Creek weir such that the estimate is within 5 percentage points of the true value 95% of the time.

SECONDARY OBJECTIVES

1) With foot surveys during peak spawning, index the number of rainbow trout spawning in 3 sections of the drainage: between the weir and confluence of the west and east forks and in the west and east forks up to the first headwater lake.
2) Tag all rainbow trout greater than or equal to 300 mm FL that pass upstream and downstream through the weir on Lower Talarik Creek.
3) Check all rainbow trout passing through the weir on Lower Talarik Creek for previously applied marks.
4) Collect hourly water temperature readings at Lower Talarik Creek while the weir is in operation.
5) Record the number of other fish by other species immigrating and emigrating past the weir.
6) Collect length information from a sample of other fish by species that pass the weir.
7) Describe spawning intervals, including skip spawning, of rainbow trout using Lower Talarik Creek by gender and test for independence between spawning history and gender and spawning history and size.
8) Estimate annual growth of rainbow trout that pass the Lower Talarik Creek weir by length and maturity status.

METHODS

DATA COLLECTION

Weir

This will be the seventh year of a multi-year research project examining rainbow trout in Lower Talarik Creek. Consecutive years of weir data are being collected to assess spawning abundance, length composition, and life history of Lower Talarik Creek rainbow trout. During April, May and June of 2015, a bidirectional weir will be deployed in Lower Talarik Creek approximately 1.6 km upstream from Iliamna Lake to capture migrating rainbow trout (Figure 2). The date of deployment will depend on when ice breaks up on the creek, but is expected to occur sometime in April or early May. The weir will be removed by mid-June. All fish species passing through the weir will be counted. All rainbow trout and a sample of fish from other species will be measured for length. Rainbow trout greater than or equal to 300 mm FL will be tagged. The weir site will be staffed by 2 permanent seasonal Fishery Technician II positions.

The weir will be constructed of pickets that are 5-foot tall half-inch electrical conduits with holes drilled 12 inches from each end. The pickets will then be strung on two one-eighth-inch aircraft cables with three-quarter-inch spacers made of half-inch PVC conduit between each picket. These pickets will be assembled into 10-foot long panels that can be rolled up for transport. The panels will be supported by a three-eighths-inch cable, which will be strung across the channel on an angle and anchored to buried anchors on the bank. The panels will be attached to each other with cam straps and leaned against the upstream side of the cable. The flow of the creek will hold the panels against the substrate, effectively blocking fish passage in the river. Sand bags and plastic mesh will be used to fill holes and secure areas that show signs of scouring. To increase rigidity, metal fence posts will be driven at a downstream angle on the downstream side of the weir and attached to the cable using T-shaped steel extensions. A 16-inch opening will be integrated between the larger panels for placing an upstream trap and downstream trap. A pyramid-shaped trap opening, located 12 inches from the streambed, will funnel migrating fish into a square holding pen for each trap. This pen will also be constructed of conduit panels and will be supported by fence posts driven into the substrate. The weir traps will be open to fish entry at all times except during sampling when a mesh panel will seal the trap to prevent fish from escaping.

Biological Composition

All rainbow trout captured at the weir for the duration of the project will be sampled for length and sexual maturity. Sexually immature fish lack secondary sexual features, whereas sexually mature fish are those fish believed to be capable of spawning or have already spawned during the spring of capture. Sexually mature males are dark, have a well-developed kype, and often exude milt. Sexually mature females are more silver, lack a kype, have an extended abdomen with an ovipositor protruding from the vent, and sometimes exude eggs. Postspawn fish often appear emaciated. Males will still be dark colored with visible physical trauma from the rigors of spawning and may still exude a small amount of milt or clear fluid. Females will have flaccid stomachs and often exude a clear liquid from the vent when light pressure is applied. Fork length will be recorded to the nearest millimeter.

All captured rainbow trout greater than or equal to 300 mm FL will be tagged with an individually numbered Floy[1] tag (Floy FD-68 B T-bar anchor tag) (Appendix A1). Incidental recaptures of Floy-tagged fish will provide additional movement information and possibly allow for the examination of survival, growth, and other stock parameters for fish captured at the weir in subsequent years.

Recaptures of previously tagged rainbow trout will be used to describe spawning histories (spawning intervals) of trout spawning in Lower Talarik Creek. The proportions of rainbow trout exhibiting different spawning histories can be estimated, by gender, for the population. Additionally, we will test if spawning history is independent of gender or size of fish at first capture.

All captured rainbow trout will be sampled for length (Appendices A2–A3), however only fish greater than or equal to 300 mm FL will be used when estimating length composition because fish smaller than this may pass through the weir undetected. Species other than rainbow trout expected to move through the weir include Arctic grayling (*Thymallus arcticus*), longnose sucker (*Catostomus catostomus*), Arctic char (*Salvelinus alpinus*), round whitefish (*Prosopium cylindraceum*) and northern pike (*Esox lucius*). In 2009 through 2014, Arctic grayling and longnose sucker were abundant (more than 500 fish, each), while the other species occurred in small numbers (less than 30, each).

Spawning Grounds Index

Technicians hiking the banks of Lower Talarik Creek will visually count spawning rainbow trout in May to index the number of spawning rainbow trout in 3 sections of the drainage: between the weir and confluence of the two forks, and the west and east forks to the first headwater lake of each fork. Each fork will additionally be separated into 1.6 km long subsections. The east fork is approximately 5 km long (3 subsections) and the west fork is approximately 8 km long (5 subsections). The boundaries of each subsection were documented with GPS coordinates during spring 2010 (see Appendix A4 for coordinates). Starting at the confluence of the east and west forks a global positioning system (GPS) will be used to locate the 1.6 km boundaries of each 1.6 km subsection.

The technicians on site will conduct the spawning ground survey once the passage of mature fish upstream through the weir has diminished and when the stream water temperature is near 6° C, which was identified to coincide with the peak of spawning (Russell 1977). Water temperature will be recorded hourly with temperature loggers and daily with a hand held thermometer. At the peak of spawning, fish will be concentrated on spawning sites, which makes them more countable. The peak of spawning should occur over the course of several days to a week. This will allow technicians to conduct a survey when conditions provide optimal visibility. Optimal survey conditions will consist of a sunny day, with little wind to riffle the water, and good water clarity for observing and counting spawning rainbow trout.

Lower Talarik Creek is a small drainage with several headwater lakes. As a result, the stream has very little turbidity and usually provides good visibility for counting fish. When the stream does become turbid, it usually clears up within a couple days (Fo, personal communication). However, if turbidity occurs, the survey will be delayed until water quality is good for viewing fish. The survey will be conducted by 2 technicians wearing polarized glasses walking up each

[1] Product names used in this publication are included for completeness but do not constitute product endorsement.

side of the creek in unison. The creek is less than 20 m wide and 3 m deep, so technicians will be able to verbally communicate and coordinate the count of fish in each survey section. If large numbers of spawning rainbow trout are observed in small areas, the technicians will attempt to count them. If the fish are moving and making an accurate count difficult, the number of fish in the concentration will be estimated.

Only sexually mature, spawning rainbow trout will be counted. Spawning rainbow trout will be differentiated from immature rainbow trout and other species by several factors of appearance and behavior. Spawning rainbow trout will generally be larger than immature rainbow trout and much darker in coloration. Spawning rainbow trout will often be paired or in groups of 3 or more in shallow riffles and the tail-outs of pools. There will be some prespawn or postspawn rainbow trout in deeper pools and runs, but their size and coloration should be identifiable. Immature rainbow trout will be silver in color and likely present in deeper pools, but may also be present downstream of spawning fish to feed on eggs. Given the width and depth of Lower Talarik Creek, rainbow trout should be easily discernable from Arctic grayling and longnose suckers.

The number of rainbow trout counted in each section will be tallied and recorded on a survey field form (Appendix A4). In addition to the numbers of rainbow trout counted, other factors including water temperature, weather conditions such as cloud cover, the presence of wind that may riffle the water reducing visibility, water clarity, and the time needed to survey each section and subsection will be recorded.

Sample Size:

Estimates of length compositions that meet the precision criteria for Objective 2 require sampling a minimum of 509 rainbow trout greater than 300 mm FL (Thompson 1987). This sample size should be achieved at Lower Talarik Creek because all fish will be sampled and an annual average of 897 rainbow trout has been sampled at the weir from 2009 through 2014.

To obtain the precision criteria for the estimated proportion of sexually mature rainbow trout (Objective 3) a minimum of 384 rainbow trout will need to be sampled (Cochran 1977). This sample size should be achieved at Lower Talarik Creek because all rainbow trout passed through the weir will be rated for maturity.

Although precision criteria are not desired for estimating length composition of other species, a sample size of 130 will be collected for both Arctic grayling and longnose suckers that pass through the weir. An average of 813 Arctic grayling were observed in 2009 through 2013, however the 2013 count was higher than previous years and skewed the average, so we will systematically sample every fifth Arctic grayling for length to provide a sample of at least 130. An average of 4,293 longnose suckers were observed in 2009 through 2013, and we will systematically sample every thirty-third longnose sucker. Every individual of less abundant species such as Arctic char, round whitefish, and northern pike will be measured for length.

DATA REDUCTION

Weir

All fish passed through the weir each day will be counted; the technicians will also tally the number of rainbow trout captured, the number of new tags deployed, the number of tagged fish recaptured, the number of fish killed or released with tags, note the hours worked, and any

equipment problems. These daily tallies will be used to track crew and project performance inseason, and to keep a running tally of the number of tags deployed and recovered on a daily basis. At the end of the study period, all tagging data will be transferred to a Microsoft (MS) Excel spreadsheet.

Biological Composition

All captured rainbow trout (≥300 mm FL) will be measured for fork length to the nearest millimeter, assessed for sexual maturity, and tagged with a Floy tag. Following insertion of a Floy tag into a rainbow trout according to instructions given in Appendix A1, the release date, length, Floy tag number, sex, maturity, and any other comments will be recorded on a sampling form (Appendices A2–A3). A subsample of other species will be measured (FL).

At the end of each day, the data recorded in logbooks will be transferred according to instructions outlined in Appendix A2 to the Age-Weight-Length (AWL) Form Version 1.2 (Appendix A3). After transferring the data, the technicians will review the completed mark-sense (AWL) forms and correct obvious coding errors.

The project leader will examine the mark-sense forms for obvious coding errors at the end of the season. The project leader will prepare the forms for shipment to Research and Technical Services (RTS) for optical scanning at the end of the fieldwork period.

Spawning Grounds Index

Field technicians will hike the length of Lower Talarik Creek and visually count the number of fish to assess the proportion of fish that spawn in each reach. The number of sexually mature, spawning rainbow trout counted in each stream section will be recorded and the sum of all sections will be the estimated number of sexually mature, spawning rainbow trout in the survey area. This count will not include the entire drainage since spawning occurs in reaches between and upstream of headwater lakes, but it will be an index of the number of spawning rainbow trout in the survey area up to the lakes.

Archiving

Final edited copies of the data (MS Excel spreadsheet and biological composition ASCII file) along with a data map describing the data files will be sent to Research and Technical Services (RTS) in Anchorage for archiving on the Division of Sport Fish intranet site ("Docushare") at http://docushare.sf.adfg.state.ak.us/. Archiving will be completed by end of winter 2015–2016. The specific location within Docushare has yet to be determined.

DATA ANALYSIS

Biological Composition

Mean length of rainbow trout greater than or equal to 300 mm FL in Lower Talarik Creek and its variance will be estimated using standard sample summary statistics (Cochran 1977).

The proportion (p_i) of rainbow trout greater than or equal to 300 mm FL of length class i, and its variance, will be estimated as a binomial proportion as follows (Cochran 1977):

$$\hat{p}_i = \frac{x_i}{x} \tag{1}$$

where

x_i = number of rainbow trout (≥ 300 mm FL) of length or maturity class i, and

x = total number of rainbow trout (≥ 300 mm FL) sampled.

with variance

$$\text{var}(\hat{p}_i) = \frac{\hat{p}_i(1-\hat{p}_i)}{x-1}. \quad (2)$$

The estimated proportion of rainbow trout that are sexually mature and the sampling variance of the estimate will be estimated using Equations 1–2 above with appropriate substitutions.

The sexual maturity by length relationship will be determined by plotting the proportion of fish that are sexually mature at each of a set of length categories. A logit model will be fitted to describe the relationship:

$$ln\frac{p_i}{1-p_i} = \beta_o + \beta_1 L_i \quad (3)$$

where p_i is the proportion of fish that are sexually mature in length category L_i.

The length at which 50% of the sampled rainbow trout are sexually mature (L_{50}) will be estimated as follows:

$$\hat{L}_{50} = -\left(\frac{\hat{\beta}_0}{\hat{\beta}_1}\right) \quad (4)$$

The variance of this estimate will be estimated using bootstrapping techniques (Efron and Tibshirani 1993).

The estimated proportions of rainbow trout exhibiting different spawning histories and the sampling variances of the estimates will be estimated using Equations 1–2 above with appropriate substitutions. The hypothesis that capture history is independent of gender will be tested using contingency table analysis (Conover 1980). The hypothesis that capture history is independent of size at first capture will be tested using the K-sample Anderson-Darling test (Scholz and Stephens 1987) or the Kolmogorov-Smirnov 2-sample test (Conover 1980) where appropriate.

Annual Growth by Size and Maturity

Schwanke (2009) demonstrated a negative relationship between annual growth (change in length) and the length of rainbow trout at the beginning of the annual interval. The data from this experiment are appropriate for a similar analysis of growth by size class. Furthermore, these data also allow us to test for differences in growth between fish of different reproductive status.

Each observation of annual growth will be classified into 1 of 3 maturity classes: "11" representing observations when the fish was determined to be immature for both first and second length measurements; "12" representing observations when the fish was immature during the first measurement and mature during the second; and "2x" when the fish was mature during the first measurement. Multiple linear regression will be used to fit models with growth (mm) as the response variable and length at the first observation (mm) and maturity class as the explanatory variables. Differences in the growth-initial length relationship between maturity classes will be investigated by allowing interactions between initial length and maturity class. Models will be

constructed for several combinations of groupings of maturity classes, in the same manner as Schwanke and Reed (*In prep*): (11,12,2x), where all 3 maturity classes will be pooled; (11,12)(2x), where maturity classes 11 and 12 will be pooled and the relationship between growth and initial length for 2x fish will be estimated separately; (11)(12,2x), where classes 12 and 2x will be pooled and the relationship between growth and maturity class 11 will be estimated separately, and (11)(12)(2x), where the relationship with each class is estimated separately. The fit of these 4 different models to the data will be compared using AIC criteria (Burnham and Anderson 2002).

SCHEDULE AND DELIVERABLES

The objectives of this project will be completed within 1 calendar year (1 field season). Following completion, continued sampling will be necessary to properly monitor the status of the population. A 2015 time schedule for initiating and completing the Lower Talarik Creek rainbow trout project is summarized below.

Task	Time frame	Responsibility
Procurement of equipment	March–April 2015	Fo
Capture and tagging	April–June 2015	Keeley/Paul
Editing of mark-sense data	November–December 2015	Fo
Data analysis	January–February 2016	Fo/Tyers
Report describing results	March 2017	Fo

Results from the FY15 field season will be documented in an Alaska Department of Fish and Game, Division of Sport Fish Fishery Data Series Report. Analysis and reporting will be completed by March 2017.

BUDGET SUMMARY

Projected FY2015 costs:

Line Item	Category	Budget ($K)
100	Personnel Services	100.0
200	Travel	0.0
300	Contractual	12.4
400	Commodities	6.2
500	Equipment	0.0
Total		118.6

RESPONSIBILITIES

LIST OF PERSONNEL AND DUTIES

1) Ian Fo, Assistant Area Management Biologist.

   Duties: Overall project supervisor. Write operational plan. Develop and administer project budget and hire seasonal staff. Primary author responsible for writing of the final project reports.

2) Jason Dye, Area Management Biologist.

   Duties: Review operational plan. Assist with collection of field data. Review final project reports.

3) Matt Tyers, Biometrician I.

   Duties: Review operational plan, provide sample size determination and estimation procedures, advise project leader regarding statistical procedures. Review Fishery Data Series report describing analyses and results of 2014–2015 fieldwork.

4) Adam Keeley and Jake Paul, Fishery Technician II.

   Duties: Assist with procurement of equipment. Ensure sampling activities and schedules are in accordance with methods prescribed in the operational plan. Make initial edit of mark-sense forms prior to their being sent to Anchorage for optical scanning. Assist in the writing of the final project reports.

5) Research and Technical Staff.

   Duties: Process mark-sense forms and archive data files.

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APPENDIX A: INSTRUCTIONS FOR TAGGING, BIOLOGICAL SAMPLING, AND RECORDING DATA

Appendix A1.–Lower Talarik Creek rainbow trout tagging procedures for handling fish and inserting Floy tags.

Upon entrance into the weir trap box, rainbow trout will be netted and measured and tagged as quickly as possible.

The condition of all captured rainbow trout will be assessed. Rainbow trout with deep scars or lesions, damaged gill filaments, a lethargic condition, or otherwise appearing unlikely to survive will not be tagged. Rainbow trout less than 300 millimeters in fork length will be sampled for length but will not be tagged.

Rainbow trout that are 300 millimeters or greater in length and in suitable condition for tagging will be sampled for length and have a Floy tag inserted on the left side near the posterior base of the dorsal fin. Lengths from tip of snout to fork of tail (FL) to the nearest millimeter, will be taken with care that the snout is not compressed.

Fish will be checked for tags or clipped fins and recorded appropriately. Length of recaptures will be recorded as above; recapture measurements will be used to assess measurement error.

Appendix A2.–Customized instructions for the Alaska Department of Fish and Game, Division of Sport Fish Standard Age-Weight-Length Form version 1.2 for Lower Talarik Creek rainbow trout.

All Floy tagging data associated with rainbow trout will be recorded on the Division of Sport Fish Standard Age-Weight-Length Form version 1.2. Page numbers will start with 001 and continue throughout the season**.** Up to 30 fish will be recorded on each form.

FRONT OF FORM

Description: Record water body name, species, and page number (e.g., Lower Talarik Creek, rainbow trout, page 34). Page number will be assigned by crew leader at the end of the day.

Date: Record the date with leading zeros (e.g. the second of May 2014 is recorded as: YEAR 14 MONTH 05 DAY 02, i.e., 14-05-02). Because each form can only have 1 date, data for each day will be on different forms.

Species: Mark appropriate codes as follows.

541 rainbow trout	640 longnose sucker
610 Arctic grayling	586 round whitefish
522 Arctic char	500 northern pike

Type of Measurement:

Length	FL Fork length from snout to fork (all freshwater fish)
Fishery	TE test fishery

Gear Code:

09	Hook and line
01	Gillnet
03	Seine
25	Hoop net
04	Weir trap

Mesh Size: Leave blank.

Location and Sublocation of Sample:

Location	Enter area code in first two columns of the top row, leave the last column blank. Enter site code in the second row (third row left blank).
Sublocation	Code is entered in the first row of the sublocation box. Additional sublocation codes may be designated by the project coordinator.

-continued-

Codes by location:

Area	Site	Sublocation	Area described
19	004	001	Passed upstream
19	004	002	Passed downstream

Project Number: Leave blank.

Page Number: Mark fields at end of day by crew leader. Pages will be numbered consecutively from 1 to XXX for each species for the season.

Sex: Mark only if absolutely known.

Maturity Index: This will apply to spawning rainbow trout.

0 = Not checked
1 = Immature: describes virgin fish; ovipositor not extended on females during spawning peak, no release of eggs or milt upon gentle pressure tto abdomen, gonads reduced, eggs or sperm not visible, does not appear capable of spawning in present year.
2 = Developing: describes first and consecutive maturation; gonads forming or fully formed with eggs or sperm visible, appears capable of spawning in the present year (captured in spring) or following year (captured in fall).
3 = Spawning: describes prespawning and spawning fish; abdomen swollen, ovipositor extended in females, males dark colored with developed kype, eggs or milt may be released upon gentle pressure to abdomen, exhibits digging or courtship behavior.
4 = Postspawning: describes spent fish; gonads may appear bruised or flaccid, majority of eggs or sperm expelled although some reabsorbing eggs may be present, ovipositor in females may still be distended and red.
7 = Unknown.

Length: Record length (to the nearest millimeter) from snout to fork of tail (do not use leading zeros).

-continued-

BACK OF FORM

Description: Record the same information as on the front of form.

Collected by: Record the name of the collector.

Age Structure Type: None.

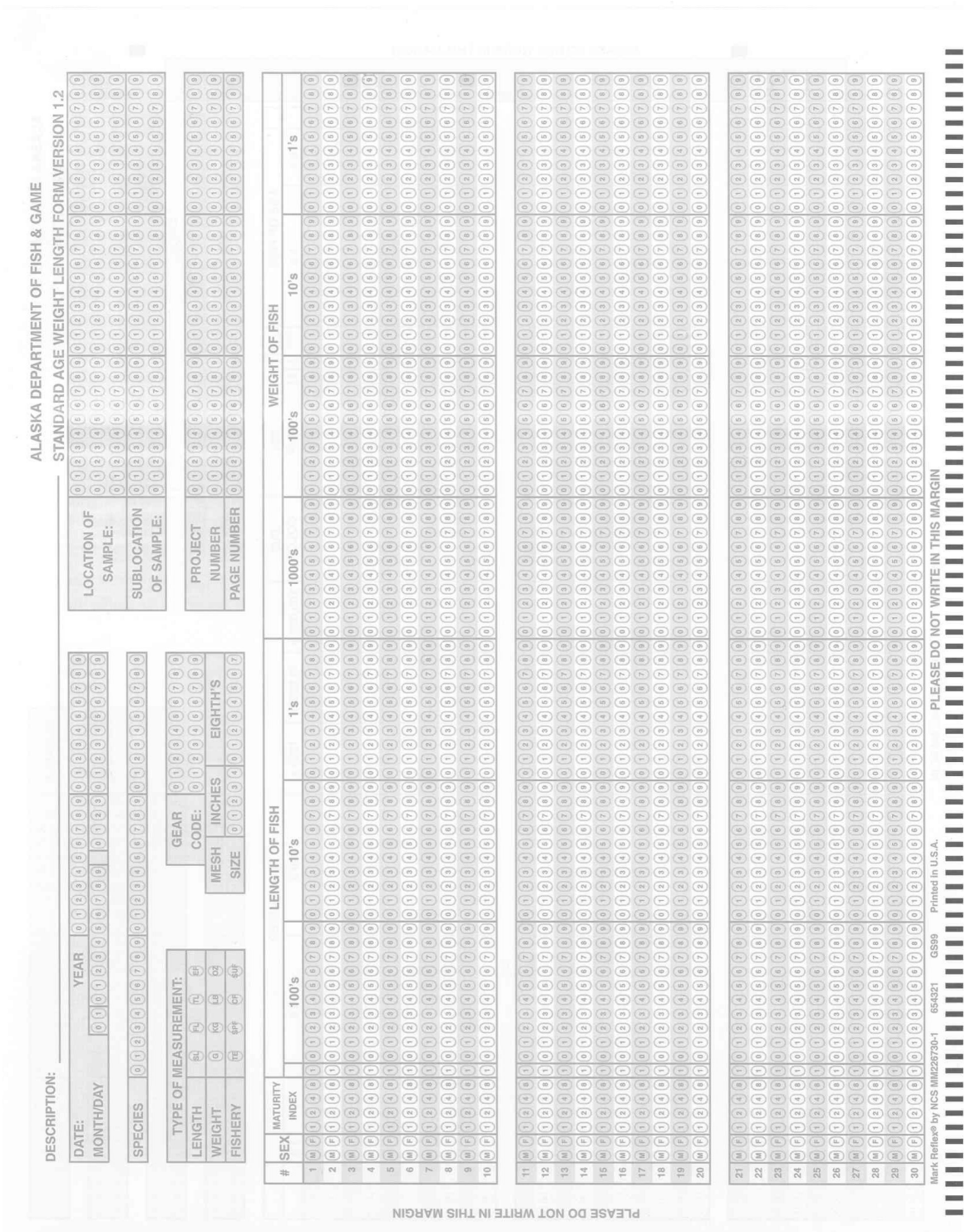
Type of Tag: Mark code for Floy tag = 24.
Record "Y" for recaptured tagged fish and record tag color and number. If a finclipped fish missing a tag is caught, record the recapture field and finclip field, mark the RP box in the finclip category (see Fin Clip) to signify loss of original tag, retag fish and record new number on the form.

Fin Clip: Record appropriate MS code and the following codes under the following circumstances:
DRP = Fish that were captured but not tagged because of poor condition.
RP = Fish which have tag scars, finclips, and appear to have lost the original tag. Retag the fish and record the new number and tag color.

Tag Color: Mark appropriate MS code(s).

Tag Number: Mark appropriate numbers for each tag number released or recaptured. Do not use leading zeros.

Appendix A3.–Alaska Department of Fish and Game, Division of Sport Fish Standard Age-Weight-Length Form version 1.2.



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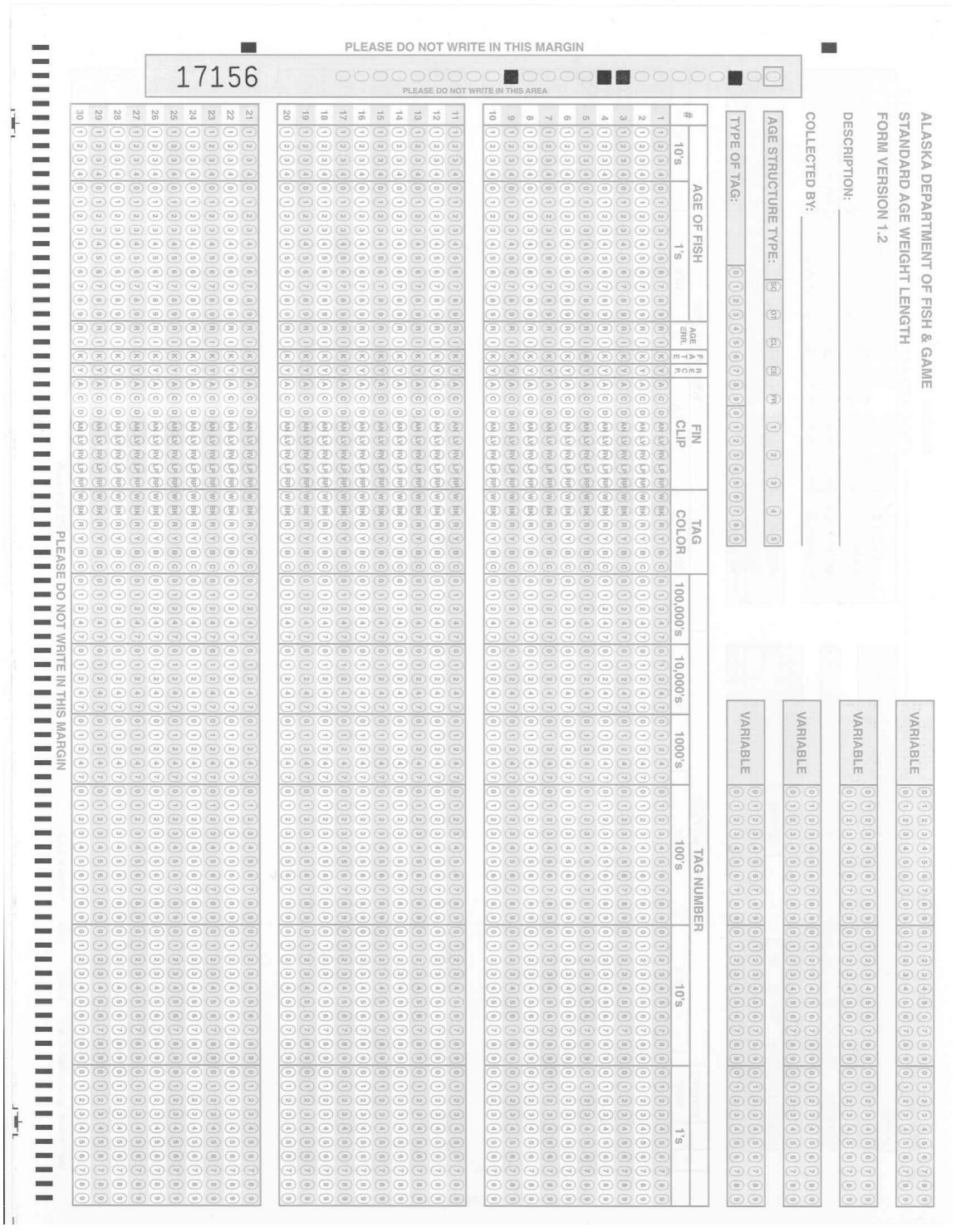

Appendix A4.–Spawning survey index count survey form.

Date:

Water Temperature:

Weather:

Water Clarity:

Section	Subsection	Count
Weir to Forks		
Weir: N 59 37.364, W 155 32.209 End: N 59 37.882, W 155 32.008	**1**	
West Fork		
Start: N 59 37.882, W 155 32.008 End: N 59 38.453, W 155 32.426	**1**	
Start: N 59 38.453, W 155 32.426 End: N 59 39.186 W 155 32.563	**2**	
Start: N 59 39.186 W 155 32.563 End: N 59 39.567 W 155 33.722	**3**	
	Subtotal	
East Fork		
Start: N 59 37.882, W 155 32.008 End: N 59 38.161, W 155 30.566	**1**	
Start: N 59 38.161, W 155 30.566 End: N 59 38.666, W 155 30.205	**2**	
Start: N 59 38.666, W 155 30.205 End: N 59 39.177, W 155 29.157	**3**	
Start: N 59 39.177, W 155 29.157 End: N 59 39.827, W 155 28.653	**4**	
End: N 59 39.827, W 155 28.653 End: N 59 40.679 W 155 28.607	**5**	
	Subtotal	
	Total	